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Attorney Docket: 072548-0293357

REMARKS

In the Office Action, the Examiner maintained the election requirement and claims 6-11, 48-49, 82-88, 94-117 and 119-120 are now withdrawn in the Application. Claims 2-4, 13, 16-18, 21-24, 26-33, 41, 43, 45-47, 50, 53, 60-62, 69, 77-81, 89-93 and 118 stand rejected under 35 U.S.C. §112 as indefinite. Claims 1, 12, 14, 15, 19, 34, 35, 38-40 and 44 are rejected under 35 U.S.C. 102(b) as allegedly anticipated by U.S. Patent No. 5,416,845 to Shen ("Shen"), claims 25, 59, 60 and 62 are rejected under 35 U.S.C. 102(b) as allegedly anticipated by Applicant's background description ("AAPA"), claims 51-52 and 54 are rejected under 35 U.S.C. 102(b) as allegedly anticipated by U.S. Patent No. 4,628,526 to Germer ("Germer"). Furthermore, claim 5 is apparently rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Shen, claims 21, 42 and 68 are rejected under 35 U.S.C. 103(a) as allegedly unpatentable over AAPA and claim 20 may be rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Shen in view of AAPA. Claims 16-18, 20, 36-37, 55-58, 63-67 and 71-76 are identified as including allowable subject matter and objected to as depending from a rejected base claim.

In this Response, claims 1-2, 4, 16, 19, 26, 36, 38, 50-51, 55 and 71 are amended.

The Allowable Subject Matter

Applicant thanks the Examiner for acknowledging the allowable subject matter of claims 16-18, 20, 36-37, 55-58, 63-67 and 71-76. Applicant has amended claims 16 and 36 to include all limitations of claim 1, has amended claim 55 to include all limitations of independent claim 51 and has amended claim 71 to include all elements of independent claim 25 and intervening claim 70. As noted in the Office Action, such amendment renders claims 16, 36, 55 and 71 and their respective dependent claims allowable. Therefore, Applicant requests withdrawal of the objections to claims 16, 18 36-37, 55-58 and 71-81. Applicant asserts that claim 20 is allowable as presented.

The Rejections under 35 U.S.C. §112

Applicant respectfully disagrees with the assertion made in the Office Action that a time response algorithm required in claims 2, 4 and 118 is not disclosed in the Specification. An algorithm is "a procedure for solving a mathematical problem (as finding the greatest common divisor) in a finite number of steps that frequently involves repetition of an operation; *broadly*: a step-by-step procedure for solving a problem or accomplishing an end especially by a computer." Webster's Third New International Dictionary, Unabridged, viewed at <http://unabridged.merriam-webster.com> (8 Aug. 2007). Thus, a time response

algorithm may be a step-by-step procedure for solving a time response problem. The Specification and drawings teach a time response algorithm.

The claimed time response algorithm is adequately disclosed, *inter alia*, in Figs. 55A-55C, 56 and 57A-57B and the associated written descriptions. In particular, the Examiner is directed to the descriptions commencing at the second full paragraph of page 119 and extending through at least the first full paragraph of page 121. For example, Fig 55A and 55B depict an example of system response to a noise floor and, in the third full paragraph of page 119, the following description of variable attack and release (VAR) operation is provided: "When changes in the noise signal occur, the initial response should be to delay, typically by a delay timer or by integrating the signal. If the change in the noise signal is longer lasting, then there should be a quick convergence on the proper noise floor...Once the response has converged on the noise floor, signal distortion is minimized by having a slow response...." This latter recitation represents a step-by-step procedure.

Furthermore, in describing the example depicted in Fig. 56 of the Drawings, it is further taught that:

The functions of segment parameter selector 2425 (also shown by dashed lines) are implemented by segment selector 5610 and lookup table 5615. The segment selector uses positive loop differential 5620, differential polarity change 5625, JK integrate 5725, slow response limit 5650, and delay time limit 5655, to select a particular segment (slow response, converge, or delay). User select 5660 and 5665 can be used to provide user selectable different segment responses, for example to allow the user to select different delay times, short delays for sporting events and longer ones for more typical use. The lookup table 5615 produces the final filter coefficients 2440 (KI 5635, KF 5640, and acceleration limit 5645) as selected by these inputs.

Specification, page 121, first full paragraph. Fig. 57B shows time response waveforms associated with the operation of this algorithm, illustrating an example of the periods in time when certain of the steps are performed.

Cognizant of the Examiner's objection to the use of the term "threshold," Applicant has amended the claims to recite "limit" in place of "threshold" in claims 2 and 4 in order to expedite prosecution. As is evident from the reproduced descriptions, the term "limit" is fully and explicitly supported in the Specification and Drawings. For at least these reasons, the §112 rejections of claims 2, 4 and 118 should be withdrawn.

Applicant traverses the §112 rejection of claim 3 based on an alleged failure to teach providing a response which is relatively slow in comparison to the change in noise indicia.

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The Specification describes time response in relation to Fig. 55A and contrasts slow time response with an increasing exponential response, among others. In one example:

Referring next to Figures 55A and 55B, various examples of the variable attack and release portion of the noise compensation function can be better appreciated. In a noise processor 1210, the variable attack/release function 2275 may be *configured to provide minimal response to short duration periods of noise (such as door slams, short burst of speech, and transient sounds), while also providing rapid response to long duration noises such as machinery or road noise.*

For at least some embodiments, *the characteristics of a useful response to changes in the noise floor signal are as follows:* When changes in the noise signal occur, the initial response should be to delay, typically by a delay timer or by integrating the signal. If the change in the noise signal is longer lasting, then *there should be a quick convergence on the proper noise floor*, preferably with increasing exponential response for attack, and decreasing exponential response for release.

This response is often desirable because the ear responds to sound in a non-linear manner, so these exponential responses sound linear to the ear. Once the response has converged on the noise signal, *signal distortion is minimized by having a slow response*, such as obtained using a conventional low-pass filter. In addition, it is desirable to have an asymmetric response, with a slower attack and faster release.

Specification, page 119, second, third and fourth full paragraph with emphasis added. It is readily apparent that the time response to short duration periods of noise is slowed and minimized. As claimed, a response that is relatively slow typically will not respond to transient and small amplitude noise fluctuations and thereby limits signal distortion. For at least these reasons, the §112 rejection of claim 3 should be withdrawn

Regarding the §112 rejection of claim 13, the Examiner alleges a failure to teach that an environmental input is digital. Applicant disagrees and submits that the rejection is predicated on a misapprehension that the environmental input is necessarily provided by an analog microphone. However, the Specification expressly recites numerous “[e]xamples of environmental sensors without acoustic coupling include speedometers, accelerometers, tachometers, and status indicators such as window up or down.” Specification, page 103, third paragraph. In some instances, these devices may be implemented as analog devices but nothing in the Specification limits the claims to purely analog operation. In the example of status indicators, these are clearly contemplated as digital signals, and in the particular example of “window up or down” the status signal is binary having only an up or down state.

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Applicant submits that the §112 rejection of claim 13 is predicated on an unreasonably narrow interpretation of the claim. Therefore, the rejection should be withdrawn.

In rejecting claims 16-18, the Office Action alleges that the Specification “does not disclose modifying in accordance with a plurality of algorithms, where the plurality of algorithms is based on a different choice within a group.” As shown above, algorithms include step-by-step procedures for solving problems or accomplishing ends. The Specification describes VARs employing plural algorithms: Fig. 56 is described as showing User Select signals 5660, 5665 connected to Lookup Table 5615 in Segment Parameter Selector 2425 and further describes how a user select lines enable different delay, converge, and slow response algorithms for particular listening situations.

The functions of segment parameter selector 2425 (also shown by dashed lines) are implemented by segment selector 5610 and lookup table 5615. The segment selector uses positive loop differential 5620, differential polarity change 5625, JK integrate 5725, slow response limit 5650, and delay time limit 5655, to select a particular segment (slow response, converge, or delay). User select 5660 and 5665 can be used to provide user selectable different segment responses, for example to allow the user to select different delay times, short delays for sporting events and longer ones for more typical use. The lookup table 5615 produces the final filter coefficients 2440 (KI 5635, KF 5640, and acceleration limit 5645) as selected by these inputs.

Specification, first full paragraph of page 121. Moreover, the Specification teaches modifying based on signals from multiple VARs. Specification, page 116, second full paragraph and Figs. 52C, 54D-54F. Therefore, the §112 rejections of claims 16-18 are improper and should be withdrawn.

Applicant respectfully traverses the rejections of claims 21-24, 41, 43, 60, 62, 69, 80 and 91 and directs the Examiner’s attention to the paragraph spanning pages 105 and 106. Applicant observes that the latter paragraph teaches processing environmental inputs into environment power estimator bus values 5220. Signal conditioning is taught that “typically involves, for example, bandpass or lowpass filtering, Fourier transforms, and/or decimation to reduce digital processing requirements.” As will be understood by those skilled in the art, the signal conditioning described in the Specification covers the signal processing steps recited in the claims. Therefore, the rejections should be withdrawn.

Regarding the §112 rejections of claims 26-33, 61 and 62 and claims 77-81, 89-93, Applicant has amended claims 26 and 77 such that each of these claims now reads “...as an

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unmodified output signal one signal of the group not modified in the modifying step...”

Applicant respectfully submits that these amendments address the concerns expressed by the Examiner. Therefore, Applicant respectfully submits that the rejections be withdrawn.

Regarding the rejections of claims 45-47, applicant has demonstrated above that the Specification adequately teaches a plurality of algorithms and that the algorithms are combined/selected as necessary to perform the intended function. Therefore, the rejections of claims 45-47 should be withdrawn.

Applicant respectfully traverses the §112 rejection of claim 53 as allegedly having no support in the Specification. Applicant draws Examiner’s attention to the paragraph spanning pages 108 and 109, commencing with the sentence: “The second section is the sensitivity control which consists of sensitivity control block 5430A-m and signal combiner block 5230A-m.” The Examiner’s attention is further drawn to Figs. 54A-54C and associated descriptions commencing at the second paragraph of page 114 and, in particular, the Examiner may be assisted by reviewing the paragraph spanning pages 114 and 115 that includes teachings such as: “These noise floors can be made to appear larger or smaller than the actual value by a noise sensitivity control 5440 and sensitivity control block 5430.” Having considered the teachings of the Specification, including those identified above, a full understanding of the terms “sensitivity control signal” and “sensitivity” may be grasped. Additionally, Applicant has amended claim 51 in a manner that should assist comprehension of the claim. Therefore, Applicant requests withdrawal of the rejection of claims 53.

Claim 50 has been amended to remove the expression “or the like kind.” Applicant disagrees with the Examiner’s characterization of the phrase but nevertheless offers the amendment for the sole purpose of expediting prosecution.

The Rejections under 35 U.S.C. §102

Applicant respectfully traverses the rejections based on Shen. Shen is directed to an active noise cancellation system in which an “anti-noise” signal is injected into a space to cancel noise detected in the space. *See Shen*, Abstract; Fig. 1A; col. 1, lines 66-68; and col. 10 lines 30-34. Consequently, Shen does not teach or suggest each and every element of the claims arranged as they are in the rejected claims.

However, for the sole purpose of advancing prosecution, Applicant has amended independent claims 1 and 38 such that each of the rejected claims now requires generation of a long duration noise floor signal. The long duration noise floor signal is operative to modify a system gain.

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Shen does not teach or suggest the generation of a long duration noise floor signal. Shen is directed to systems that would have no use for a long duration noise floor signal. Instead, Shen expressly teaches the creation of an anti-noise signal that is the inverse of a noise signal detected by at least two microphones. Shen does not contemplate modifying a system gain according to processing of an environmental input as recited in the claims. Therefore, Applicant respectfully submits that the amendments to claims 1 and 38 render the Shen-based rejections moot and eliminates Shen from consideration as prior art in the current Application.

Moreover, Shen teachings are limited to systems for generating an inverse of a signal representative of audible noise detected by at least two microphones. In particular, Shen teaches a well-known adaptive noise cancellation technique that modifies FIR filter tap weights over time. The effectiveness of an adaptive noise cancellation device requires rapid convergence on new values of tap weights to maintain an "ideal" anti-noise signal; to delay or slowly converge would render the cancellation signal inoperative. Thus, Shen teaches a system that operates differently from the presently claimed invention and, as a consequence, the combination of the cited Shen elements could not be construed as arranged in the manner of the claims because such arrangement would render Shen's device inoperative.

Applicant further traverses the rejections of the dependent claims for at least the reason that Shen does not teach the additional limitations arranged as they are in the claims.

Therefore, the §102 rejections of claims 1, 12, 14, 15, 19, 34, 35, 38-40 and 44 should be withdrawn.

AAPA Rejections

Applicant respectfully traverses the §102 rejections of claims 25, 59, 60 and 62 as set forth in the Office Action. The rejections are based on a misperception of the discussion of prior art systems in the Background section of the Specification. Specifically, the Examiner incorrectly asserts, *inter alia*, that Fig. 2 teaches determining the difference between an environmental input and a reference signal to generate a negative feedback signal. In fact, Fig. 2 depicts generation of a *positive feedback* signal.

With reference to the explicit teachings in the paragraph spanning pages 4 and 5 of the Specification, it can be seen that Fig. 2 teaches an Environmental Noise Signal is generated by a subtractor that subtracts a reference signal from a noise signal. As indicated by the relative locations of the positive (+) and negative (-) symbols on the subtractor of Fig. 2:

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Environmental Noise Signal = Environmental Input – Reference

Consider that, for a constant speaker output, as noise increases above the reference signal level, the Environmental Noise Signal increases, thereby increasing the Gain provided by the Gain Calculate block. The increased gain increases the output level of the speaker in order to overcome or “drown out” the environmental noise. This function characterizes a system that generates a *positive feedback signal* rather than the opposite *negative feedback signal* required in the claims. Therefore, the AAPA-based rejections of claims 25, 59, 60 and 62 are improper and should be withdrawn because the AAPA does not teach the claimed inventions.

Germer Rejections

Applicant has amended independent claim 51 to better set forth certain aspects of the invention. Claim 51 now requires providing a noise sensitivity control signal for modifying the signal-to-noise ratio of a system output. Germer teaches no such modifying. Therefore, the rejections of claims 51-52 and 54 are moot and should be withdrawn.

The Rejections under 35 U.S.C. §103

Applicant respectfully traverses the rejection of claim 5. While the generic term converging may be known in the art, the claim requires converging on a noise level corresponding to the noise indicia above the limit following the delayed response wherein the converging step includes one of a group comprising: a nonlinear response, an exponential response, and a logarithmic response. The effect obtained from the claimed invention would not have been obvious to one of skill in the arts and particularly in the field of active noise cancellation. Therefore the rejection is improper and should be withdrawn.

Regarding claims 21, 42 and 68, it has been shown above that AAPA can not be construed as suggested in the Office Action and Humphrey does not cure the deficiencies of the prior art discussion. Therefore the rejections of claims 21, 42 and 68 should be withdrawn.

Regarding claim 20, both Shen and APAA have been shown above to be defective as support for the §102 rejections. Since these references provide no mutual cures for their respective deficiencies, the rejection of claim 20 is improper. Therefore, the rejection of claim 20 should be withdrawn because the combination of Shen and APAA fails to teach every element required in claim 20.

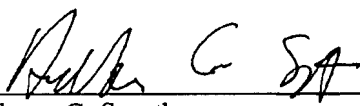
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CONCLUSION

All objections and rejections have been addressed and prompt examination on the merits is earnestly solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is requested to contact the undersigned at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,
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